

# Answer List for Reviewer

Dear Reviewer,

First of all, we would like to express our deep gratitude to you, who has spent time reading our manuscript and give us some comments. Basing on your comments and questions, we have been tried our best to revise the manuscript. We would like to list here the questions and our answers.

1. The introduction makes it sound as if the present work is the first slotless bearingless motor. Many papers have been written about this paper over a span of many years. Some of these other works should be referenced. For example, 10.1109/TIA.2015.2466683, 10.1109/TIE.2014.2311379

## Answer:

In our research, Slotless Self-bearing Motor is an electromechanical actuator which can provide radial translation and rotation simultaneously. Meaning that it is one kind of radial combined magnetic bearing motor which does not have slot for stator coil. Moreover, the stator of Slotless Self-bearing Motor doesn't have an iron core.

Professor Johann W. Kolar and his research group (10.1109/TIA.2015.2466683, 10.1109/TIE.2014.2311379) are very famous in the field of Slotless Self-bearing Motor. However, the Slotless Self-bearing Motor in their research is different from ours because it uses iron core for stator and the copper coils are wound around the stator core. The below figures show the difference between two kinds of the motor:

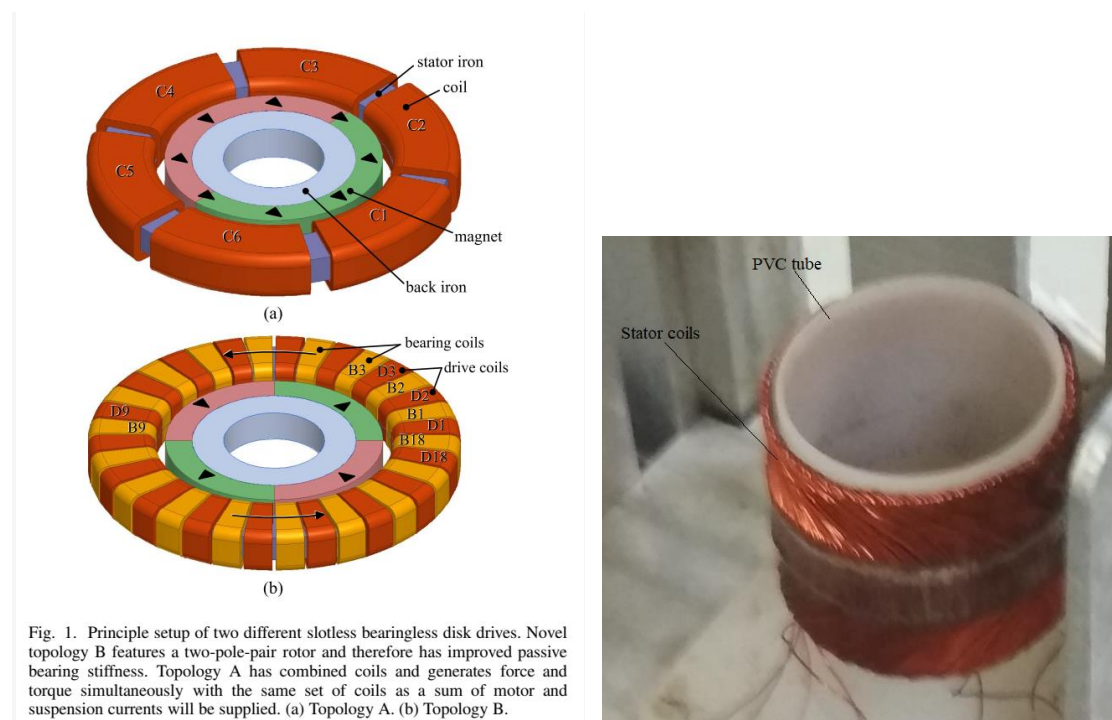


Fig. 1 Stator of the Slotless Self-Bearing Motor in our research

Obviously, two kinds of motor are different both structure and control strategy.

2. The rotating back iron design is also not very novel. Thingap ([www.thingap.com](http://www.thingap.com)) has been marketing motors with this topology for a long time--just not bearingless ones

## Answer:

We agree that the rotating back iron design is also not very novel. There are many products introduced on the market. For example ironless DC motor from Maxon, Coreless Brushless DC Motors from ISL Products, TG Brushless DC Motors from ThinGap.. However they do not have the functions of self bearing motor. In our research, by rationally arranging the stator windings and by using of superposition principle we can confirm that the Slotless Self-Bearing Motor can simultaneously generate torque and radial bearing force without iron core. For this kind of the Slotless Self Bearing Motor, not so many publications can be found.

3. The control scheme of the motor is also not very novel. 10.1109/IAS.2012.6374033 is an example of a similar DQ-based control scheme for motoring and suspension.

Answer:

With the paper 10.1109/IAS.2012.6374033 of Professor Masahide Ooshima and his group, the bearingless motor is one kind of radial combined magnetic bearing motor. However it also uses iron core for stator and the coils are inserted in the stator slots. The below figures show the difference between the bearingless motor of Prof. Masahide Ooshima and ours.

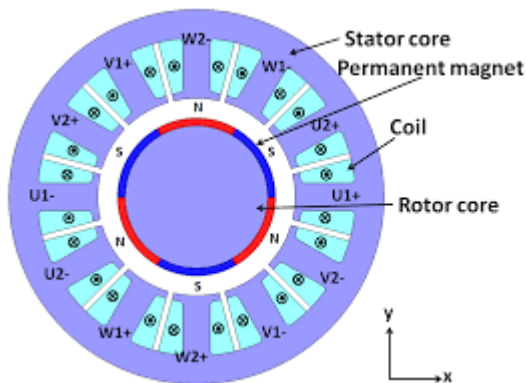


Fig. Bearingless Motor of Prof. Masahide Ooshima

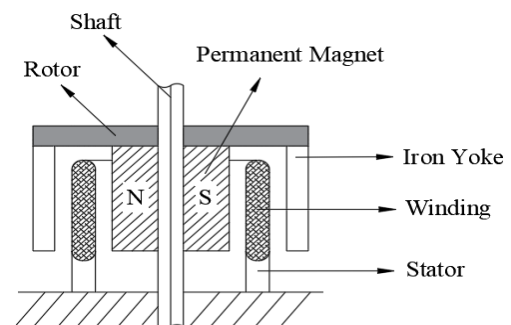


Fig. Our Slotless Self-Bearing Motor

Obviously, two kinds of motor are different in both structure and control strategy.